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(71) Applicant: GENERAL ELECTRIC COMPANY  
1 River Road  
Schenectady, NY 12345(US)

(72) Inventor: Corsmeyer, Robert James  
2277 East Galbraith Road  
Cincinnati, Ohio 45237(US)  
Inventor: Reigel, James Robert

10546 Gloria Avenue  
Cincinnati, Ohio 45231(US)  
Inventor: Sponseller, Robert Lee  
8022 Eagleridge Drive  
West Chester, Ohio 45069(US)  
Inventor: MacLin, Harvey Michael  
9266 Steeplechase Drive  
Cincinnati, Ohio 45242(US)

(74) Representative: Pratt, Richard Wilson et al  
London Patent Operation G.E. Technical  
Services Co. Inc. Essex House 12/13 Essex  
Street  
London WC2R 3AA(GB)

(54) Turbine rotor disk with integral blade cooling air slots and pumping vanes.

(57) A rotor disk (33) for a gas turbine engine includes a central load-bearing web portion (70) and a centrifugal pump (62) portion located externally of the load-bearing web portion for pumping cooling air into an array of turbine blades. The pump portion

includes an enlarged material section (75) formed homogeneously with the web portion (70) and extends axially forwardly and radially inwardly from the rim (61) of the disk.

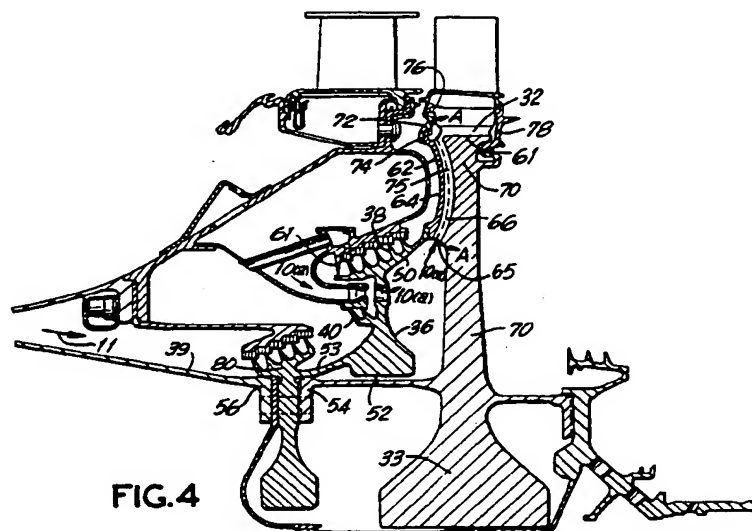


FIG. 4

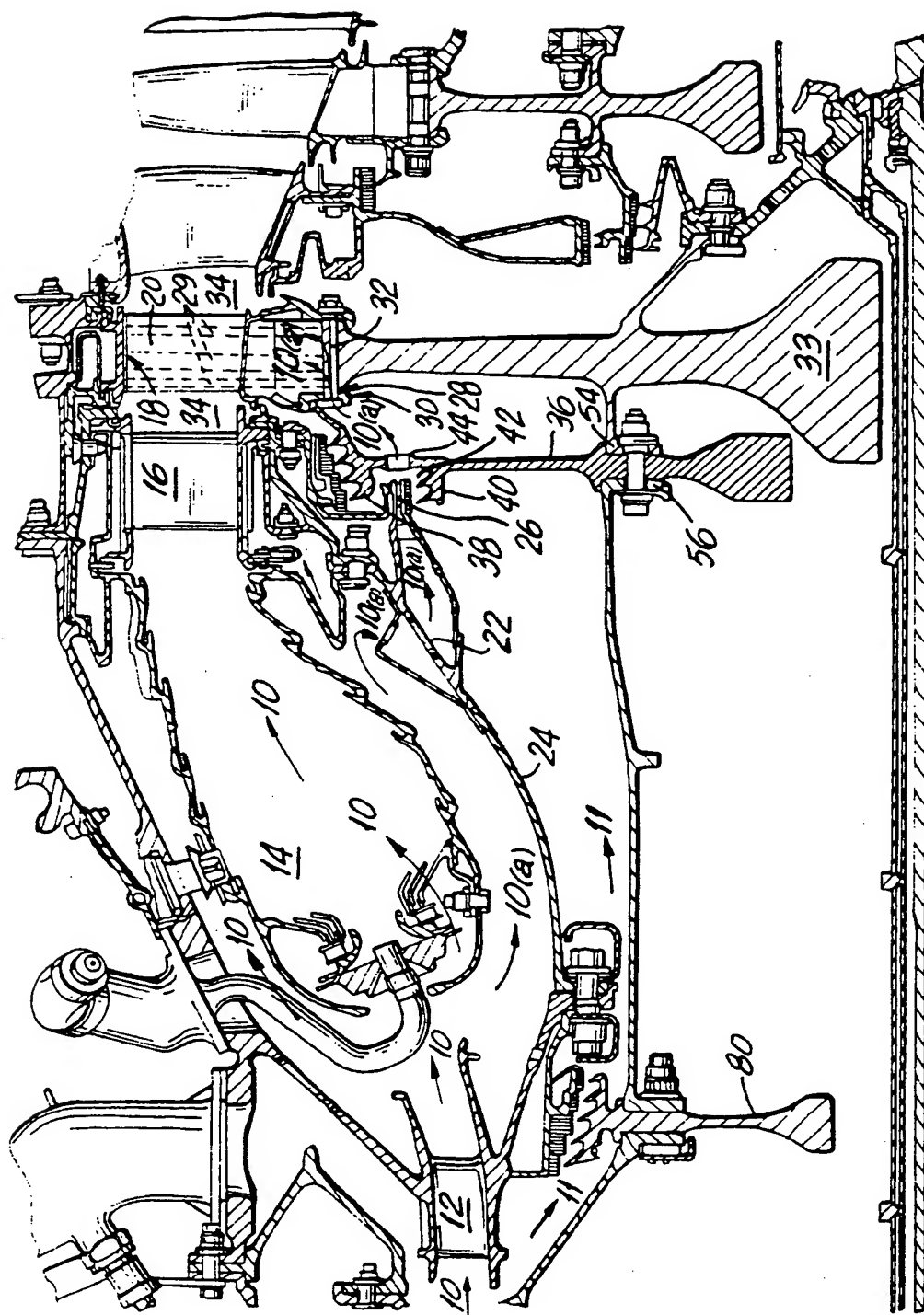
material section is formed homogeneously with said web portion.

10. The disk of claim 1, wherein said internal slot is disposed completely externally of said web portion. 5
11. A forward seal and rotor disk assembly, comprising:
  - a rotor disk comprising a hub portion, a web portion, a rim portion, and a material section extending axially forwardly from said web portion and having a plurality of slots formed there-through; and 10
  - a forward seal comprising a hub portion, at least one labyrinth seal, and an air shield arm projecting from said forward seal and sealingly engaging said material section of said rotor disk. 15
12. The assembly of claim 11, wherein said air shield arm projects from said labyrinth seal. 20
13. The assembly of claim 12, further comprising an inner labyrinth seal for sealing compressor discharge leakage air, said inner labyrinth seal comprising a support arm for supporting said forward seal. 25
14. The assembly of claim 13, wherein said forward seal is cantilevered from said inner labyrinth seal. 30
15. The assembly of claim 11, wherein said rotor disk further comprises a flange for mounting said rotor disk to a rotor shaft and wherein said hub portion of said forward seal is disposed radially outwardly of said flange. 35
16. The assembly of claim 11, wherein said rotor disk further comprises a flange for mounting said rotor disk to a rotor shaft and wherein said plurality of slots is disposed radially outwardly of said flange. 40
17. A rotor disk for a turbine engine, said disk comprising a hub portion, a web portion extending radially outwardly from said hub portion, a rim portion located on a radially outer end portion of said web portion, and pumping means disposed externally of said web portion and formed homogeneously with said web portion for pumping cooling air radially outwardly adjacent said web portion and into said rim portion. 45 50 55
18. The rotor disk of claim 17, wherein said pumping means comprises a plurality of radially

extending slots located adjacent said web portion.

19. The rotor disk of claim 18, wherein said pumping means further comprises a plurality of circumferentially-spaced and radially extending vanes located between said plurality of slots.

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**FIG. 1**

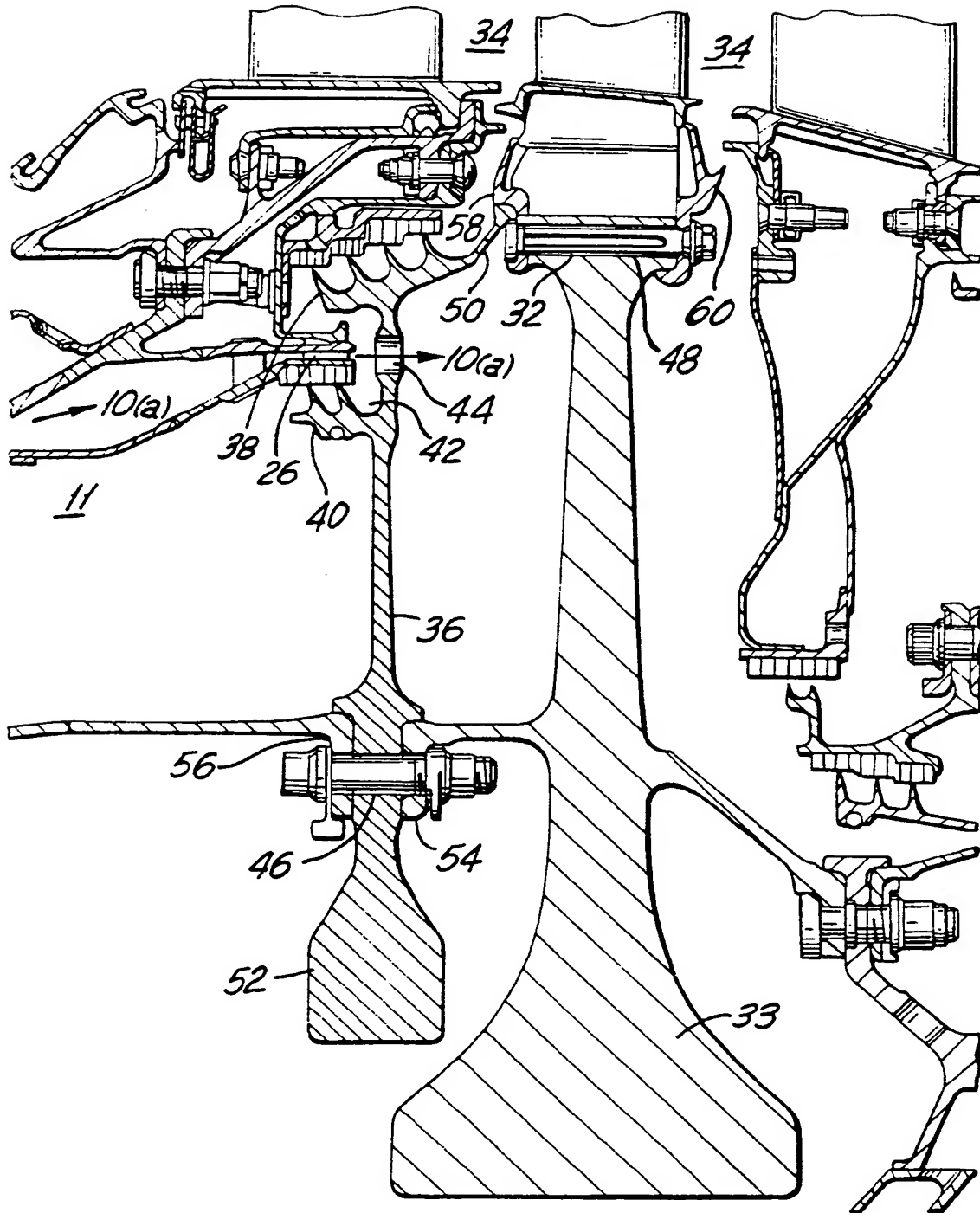
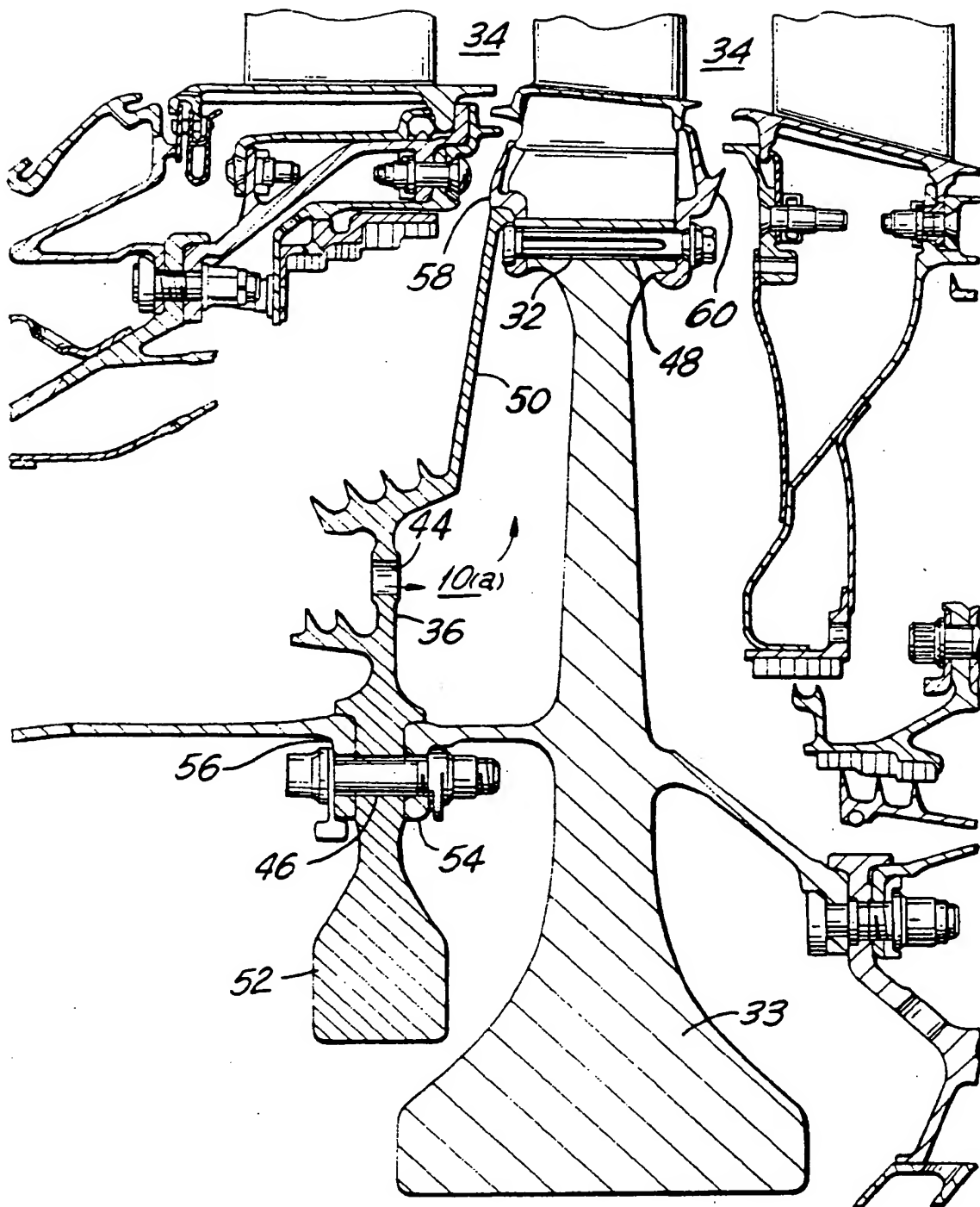
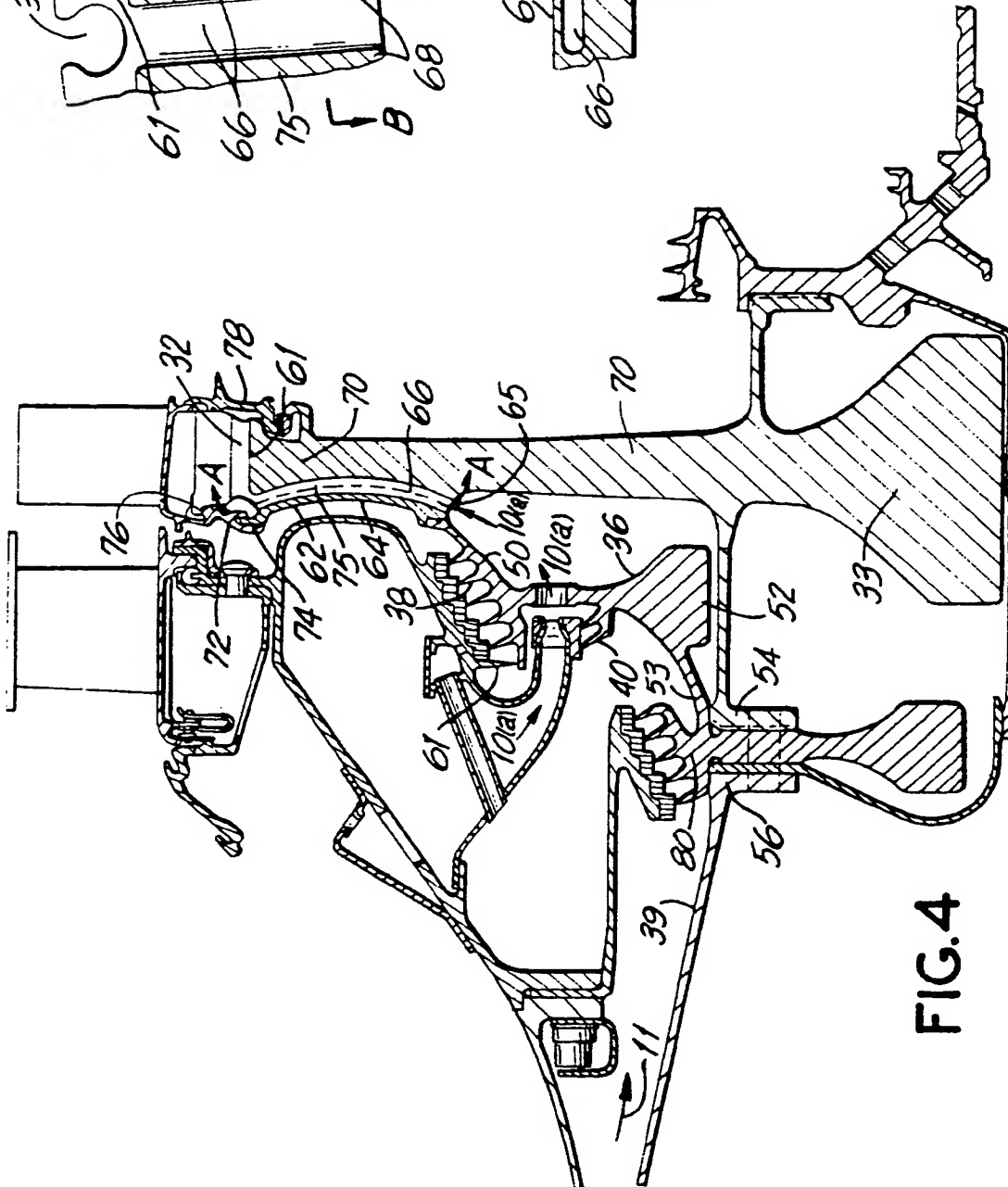
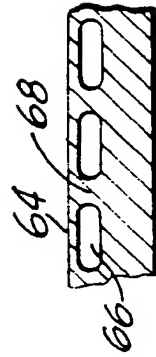
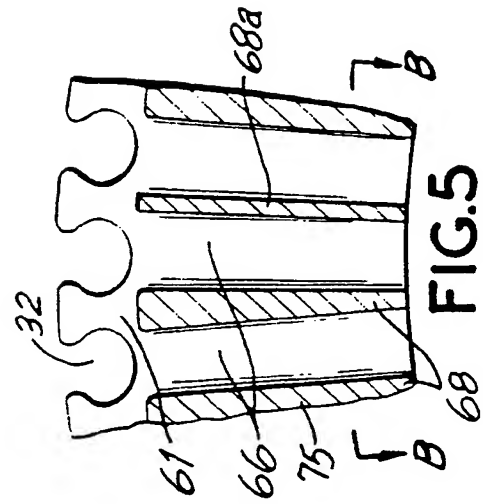
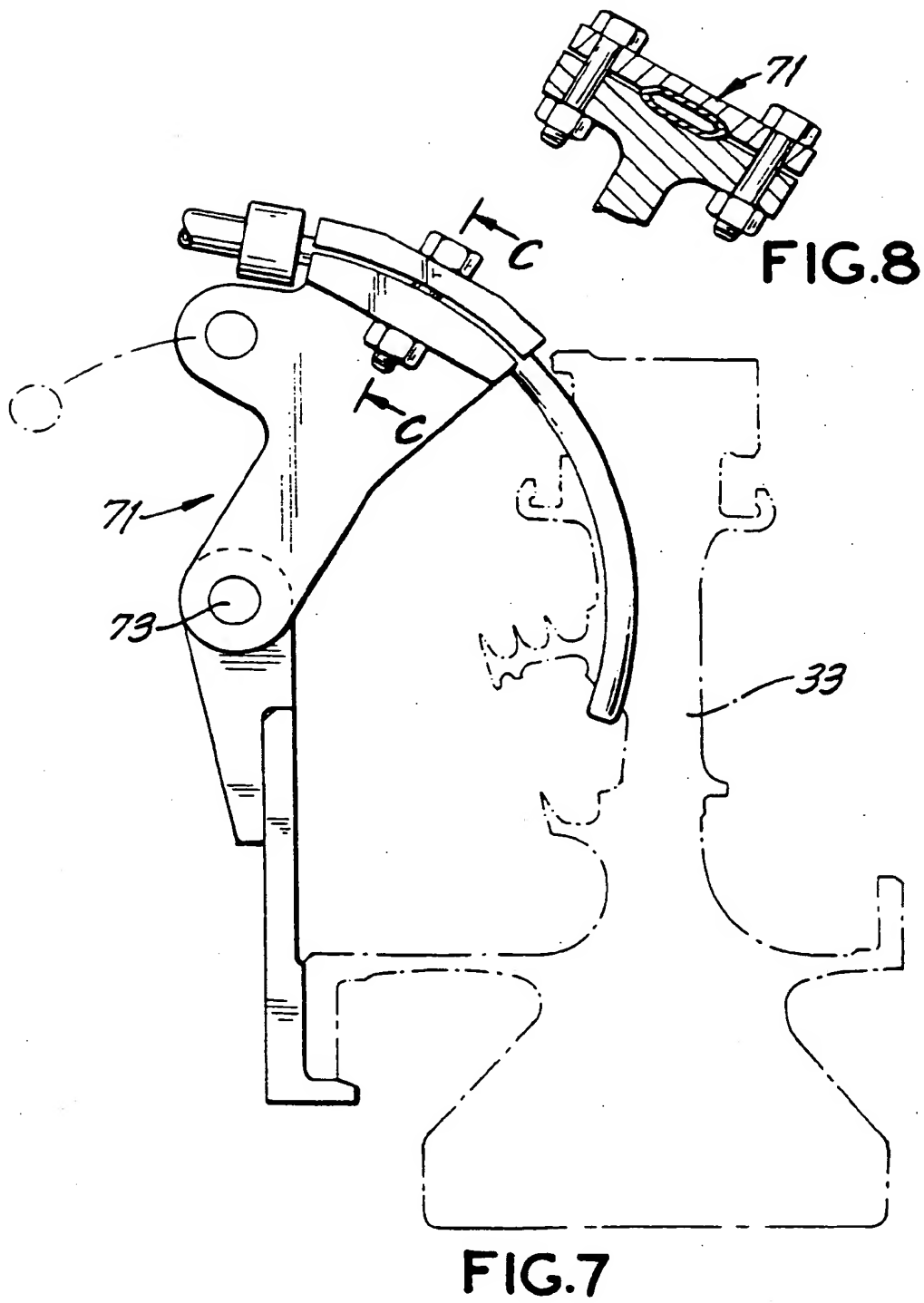


FIG. 2



**FIG.3**





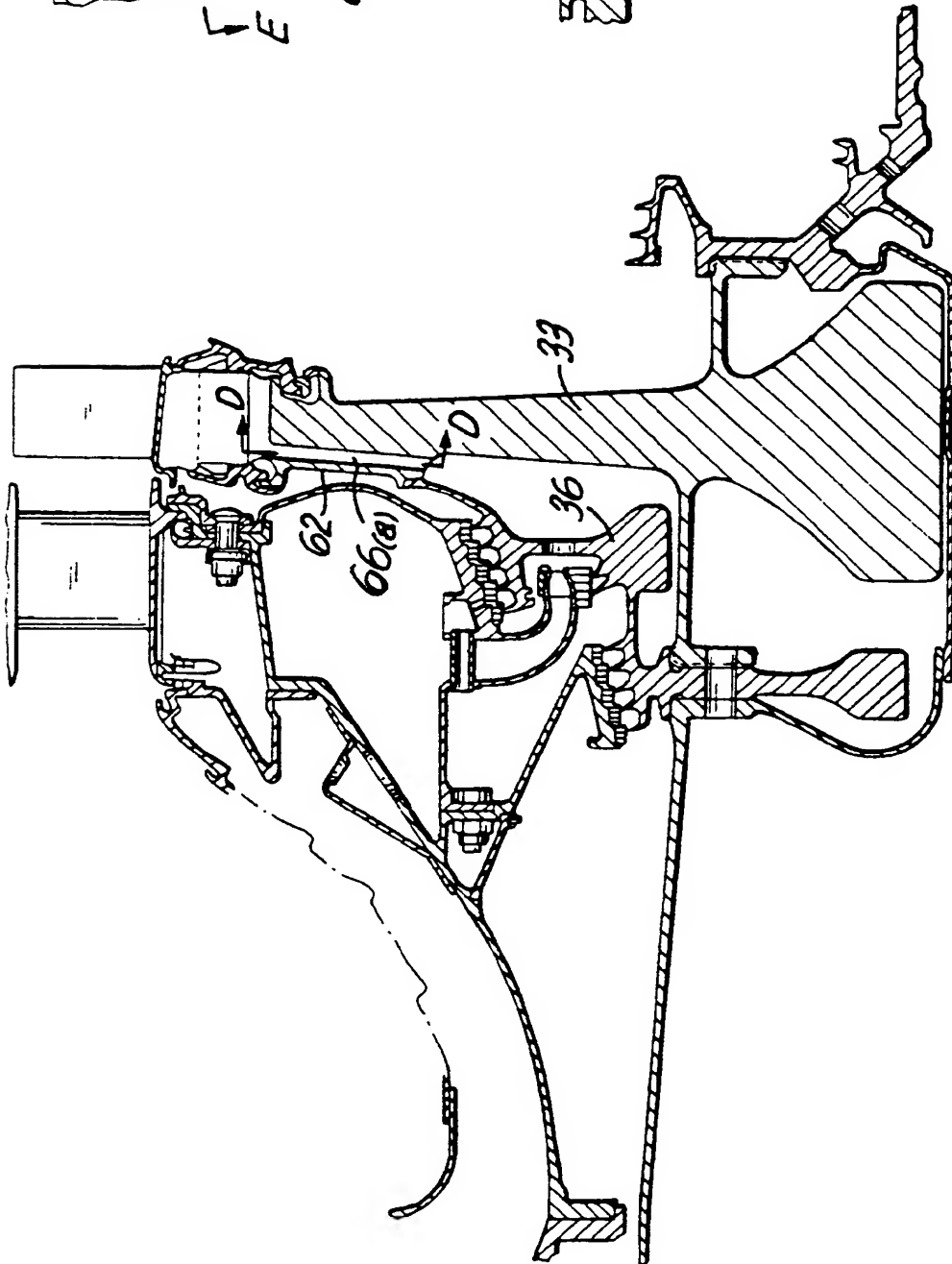


FIG. 9

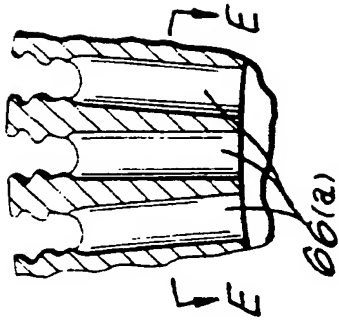


FIG. 10

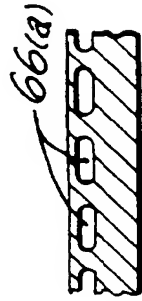


FIG. 11





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## EUROPEAN SEARCH REPORT

Application Number

EP 91 30 9696

### DOCUMENTS CONSIDERED TO BE RELEVANT

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	GB-A-2 189 845 (GENERAL ELECTRIC)  * page 1, line 5 - line 8 * * page 2, line 8 - page 3, line 50; figures * -----	1,2,4,5, 10,17,18	F01D5/08
A	US-A-3 814 539 (KLOMPAS)  * column 1, line 6 - line 10 * * column 2, line 46 - column 4, line 22; figures 1,2B * -----	1,4-7, 10,11, 17,19	
A	FR-A-2 614 654 (SNECMA)  * page 1, line 1 - line 4 * * page 3, line 30 - page 5, line 22; figure 1 * -----	1-3,9, 11,17	
A	FR-A-2 292 868 (GENERAL ELECTRIC) * page 1, line 36 - page 2, line 1 * * page 2, line 12 - page 3, line 38; figure * -----	11,12,13	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			F01D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 26 MAY 1992	Examiner ZIDI K.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	

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